

The Federal government is the single largest energy consumer in the United States, requiring energy for approximately 500,000 buildings comprising over 3 billion square feet of floor area. Increased efficiency in the Federal government's energy consumption can deliver substantial energy and financial savings to the nation as a whole. Additionally, the successful implementation of energy-efficient practices can act as a catalyst to encourage State and local governments, privately-owned companies, and other entities to emulate these actions. Through the adoption of energy efficiency and renewable energy technologies and practices, the Federal government can provide a working model with proven results for the nation.

SEP SPECIAL PROJECTS FUNDING FOR FEMP:

1996	\$554,000
1997	\$580,000
1998	\$966,000
1999	\$683,349

total:	\$2.8 million
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The Federal Energy Management Program (FEMP) seeks to not only assist in streamlining the Federal budget through cost-saving strategies, but to set an energy example for the nation. FEMP is a customer-oriented program, which seeks to create partnerships, leverage resources, transfer technology, and provide training and support to the thousands of Federal offices nationwide. When agencies commit to these energy efficiency projects, the Federal sector moves closer to achieving broader energy and cost saving



HEADQUARTER I CORPS IS ONLY ONE OF THE MANY BUILDINGS AT FORT LEWIS IN TACOMA, WASHINGTON, THAT WAS MADE MORE ENERGY-EFFICIENT THROUGH FEMP AND SEP SPECIAL PROJECTS.

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goals. One of these goals, set by Executive Order 13123, is to reduce net energy consumption by 35% from FY 1985 to FY 2010. Federal agencies can meet this goal by implementing energy efficiency and renewable energy practices and technologies.

Through SEP Special Projects funding, FEMP conducts three types of activities: project financing, technical guidance and assistance, and planning, reporting, and evaluation. FEMP guides Federal agencies in their energy efficiency efforts and helps Federal Energy Managers identify and procure the best, most cost-effective energy-saving projects. State Energy Offices and FEMP work together to develop innovative ideas to implement their goals on the State and local level.

The State of **Michigan** implemented a standout project with ambitious goals. The *FEMP/Michigan Partnership Grant* employed three key tactics to promote energy and water efficiency: training, on-site technical assistance, and information dissemination. With assistance from the Michigan Department of Consumer & Industry Services, the project used the Internet to identify 180 Federal agency contacts. The project then asked those contacts to submit the most recent 12 months of utility history, along with floor plans and other pertinent information. After professional pre-evaluation, a sub-contractor contacted the agencies for energy audits. Upon completion of the audits, the results were fully explained and cost-cutting strategies were proposed. The agencies were also provided information regarding building operator training, business manager basic energy

training, energy efficiency scholarships, and other FEMP services. To date, the FEMP/Michigan Partnership grant has audited 27 buildings (865,038 square feet) and identified \$864,000 in energy improvements.

Some States have shown exemplary dedication to achieving the goals of Executive Order 13123. **New York** has been especially active with the FEMP program, concentrating on achieving energy efficiency at Armed Services facilities across the State.

The *Federal/New York State Energy Management Partnership* conducted three projects at the U.S. Army's Fort Drum. In 1996, the FEMP project evaluated the current ventilation system and recommended energy-efficient options for installing an air-conditioning system. The study identified five technologies as viable: geothermal, desiccant cooling, ice storage, conditioned ventilation, and modular fancoil units. Geothermal was determined to be the most cost- and energy-efficient technology. Fort Drum has designed a GHP ventilation system and is awaiting its installation.

Funding from this SEP Special Project was also used to address the water and wastewater system of Fort Drum and the surrounding area. The analysis showed that the two 350hp wastewater pumps were tremendously oversized, and a single 75hp pump would meet present wastewater needs. Installation of the pump created an energy savings of \$11,500 per year and has reduced the Fort's energy budget by 14% annually. In 1997, the Federal/New York State Energy Management Partnership again assisted Fort Drum, but this project

Installation of a wastewater pump at Fort Drum resulted in \$11,500 annual energy savings and reduced the Fort's energy budget by 14%.



DANGLING ROPE MARINA, UTAH, UTILIZED A NEW GENERATION OF HYBRID PV POWER EQUIPMENT. THIS NEW TECHNOLOGY, COMBINED WITH THE DECLINING COSTS OF PV, CONTRIBUTES TO AN EXPANDING MARKET FOR LARGE-SCALE PV HYBRID POWER SYSTEMS.

addressed the coal-fired water heating facilities at the compound. This system had been costly to operate and, due to the existence of gas lines, the Fort had decided to convert the system to natural gas. The evaluation of that conversion determined that a 147 building retrofit would yield \$292,000 in annual savings. To date, the Fort has converted 150 buildings and plans to convert 300 more.

Another recipient of the Federal/New York State Energy Management Partnership, was the U.S. Air Force's Verona Test Annex at the Rome Research Site. In 1996, FEMP analysis identified \$140,000 in energy efficiency improvements that would save \$13,740 annually in electricity and fuel oil. FEMP again conducted a project at the Rome Research Site in 1997, addressing the cooling system for the compound's high-power laser activities. The existing model cooled 13 lasers with a once-through, portable water system that wasted 4,000 gallons per day and did not adequately cool the lasers in the summer months. The Federal Research Site asked that FEMP

evaluate two different types of cooling systems to replace the existing inefficient method. The analysis determined that a central chiller would save \$87,500 in annual costs and 430,000 kilowatts of electricity per year.

Washington State is providing energy efficiency assistance to a variety of local entities through a partnership between FEMP and Washington State University. The two groups joined forces to launch an energy efficiency information and training network, which developed Resource Efficiency Managers (REMs) within public, private, and government organizations to seek out energy efficiency opportunities and develop energy efficiency projects. The FEMP/Washington State University partnership developed in-person training on resource conservation, promoted a nationwide network of REMs to encourage peer exchange, developed a call-up information service, and began a Total Efficiency Network (TEN) website. The partnership has also created fact sheets, success stories, newsletters, and software, conducted workshops and

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training, and organized conferences. TEN has provided technical assistance to hundreds of people, and has coordinated efforts at U.S. Army Base Fort Lewis, U.S. Navy Station Whidbey Island, U.S. Navy Undersea Warfare Engineering Station, five private utility companies, and various school districts and universities.

One of the most widely successful and diverse FEMP projects to date is *Utah's Energy Program for National Parks*. The project provided technical assistance in a variety of forms to 11 separate parks, monuments, and historic sites within the State's National Park Service. The focus of this project was not only to save energy for the Federal agency, but also to explore alternate energy options. Energy audits were performed at Dinosaur and Timpagos Cave National Monuments, Bryce Canyon and Capital Reef National Parks, and at the Golden Spike Locomotive Building (a historical landmark). The total audited area was 164,000 square feet, and over \$100,000 of energy efficiency projects were identified. The National Park Service estimated an energy cost savings of \$21,000 per year.

Many of the National Parks in **Utah** are located off the power grid and must be powered by generators or other means. Some parks are already utilizing existing photovoltaic (PV) systems, and those sites were subjected to performance verification studies. From these studies, approximately 50 defective modules were replaced under warranty. Six State parks were analyzed based on economic factors and engineering feasibility to determine which alternative power systems were most viable. From this information, it was determined that PV systems were appropriate for several of the sites, including Canyonlands – Maze District, Canyonlands – Needles District, Dangling Rope Marina, and Halls Crossing Marina. Currently, there are seven renewable energy projects that are complete or in process due to Utah's Energy Program for National Parks. Together, these sites resulted in significant environmental benefits, avoiding the use of 284,000 gallons of various conventional fuels per year. Additionally, the parks mitigated 257 tons of carbon dioxide emissions, 4,706 lbs. of nitrogen emissions, and 430 lbs. of sulfur emissions.

Executive Order 13123 requires that the Federal Government reduce its net energy consumption by 35% from FY 1985 to FY 2010.

Location	Initial System Cost (fuel + operating cost)	Annual Savings	Years to Payoff
Needles District PV	\$550,000	\$23,400	23.5
Dangling Rope PV	\$306,000	\$25,600	11.9
Zion Remote Cabin PV (2 PV systems)	\$12,500	\$6,000	2.0
Bryce Canyon Water Pumping (2 PV systems)	\$18,500	\$8,800	2.1
Dinosaur Fire Tower	\$8,700	\$1,300	6.6
Maze District Inverter	\$26,700	\$4,500	5.9